

Unit 6

Rational Expressions

Day 1

Simplifying, Multiplying and Dividing

Rational Expression- is the quotient of two polynomials, in which the denominator can not have a value of the variable that will make it become zero.

Finding the restrictions (domain) of a rational expression:

1) $\frac{3}{x+2}$

$$x+2 \neq 0$$

$$x \neq -2$$

$$(-\infty, -2) \cup (-2, \infty)$$

Finding the restrictions (domain) of a rational expression:

$$2) \quad \frac{x+4}{x^2+3x+2}$$

$$x^2+3x+2 \neq 0$$

$$(x+2)(x+1) \neq 0$$

$$\begin{array}{l|l} x+2 \neq 0 & x+1 \neq 0 \\ x \neq -2 & x \neq -1 \end{array}$$

$$x \neq -2 \quad x \neq -1$$

$$(-\infty, -2) \cup (-2, -1) \cup (-1, \infty)$$

Finding the restrictions (domain) of a rational expression:

$$3) \quad \frac{2a-5}{2a^2+1}$$

$$2a^2+1 \neq 0$$

$$2a^2 \neq -1$$

$$a^2 \neq -\frac{1}{2}$$

$$a \neq \pm \sqrt{-\frac{1}{2}} = \pm i \sqrt{\frac{1}{2}} = \pm i \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \pm i \frac{\sqrt{2}}{2}$$

Simplifying:

4)

$$\frac{32a^2b^5}{10ab^7} = \frac{16a}{5b^2}$$

Simplify:

5)

$$\frac{x+2}{x^2+5x+6} = \frac{\cancel{(x+2)}}{\cancel{(x+2)}(x+3)} = \frac{1}{x+3}$$

Simplify:


6)

$$\frac{6-3k}{k^2-4} = \frac{3 \overset{-1}{\cancel{(2-k)}}}{(k+2)\cancel{(k-2)}}$$

$$\frac{\cancel{(2-k)}}{(k-2)} = \frac{(-k+2)}{(k-2)} = \frac{-1\cancel{(k-2)}}{\cancel{(k-2)}} = -1$$

Multiplying Rational Expressions:

7)

$$\frac{\frac{2}{\cancel{8}x^4}}{\frac{\cancel{5}xy^2}{1}} \cdot \frac{\frac{2}{\cancel{10}y}}{\frac{\cancel{12}x^2}{3}} = \frac{4x^4y}{3x^3y^2} = \frac{4x}{3y}$$


Multiplying Rational Expressions:

8)

$$\frac{3x+6}{2x^2-7x+3} \cdot \frac{2x^2-15x+7}{x^2-5x-14} =$$

$$\frac{3(\cancel{x+2})}{(\cancel{2x-1})(x-3)} \cdot \frac{(\cancel{2x-1})(\cancel{x-7})}{(\cancel{x-7})(\cancel{x+2})} = \frac{3}{x-3}$$

Dividing Rational Expressions:

9) $\frac{10x^3}{30x^4} \div \frac{50x^5}{20x^3} = \frac{\overset{1}{\cancel{10}}x^3}{\underset{3}{\cancel{30}x^4}} \cdot \frac{\overset{2}{\cancel{20}}x^3}{\underset{5}{\cancel{50}x^5}} = \frac{2}{15x^3}$

Divide:

10)

$$\begin{aligned} & \frac{A \cdot \frac{3p^2 + 11p - 4}{24p^3 - 8p^2} \cdot C \cdot \frac{9p + 36}{24p^4 - 36p^3}}{B \cdot \frac{8p^2(3p-1)}{2}} = \frac{A \cdot \cancel{(3p-1)} \cdot \cancel{(p+4)}}{\cancel{8p^2} \cdot \cancel{(3p-1)}} \cdot \frac{\cancel{1} \cdot \cancel{12p^3} \cdot (2p-3)}{C \cdot \cancel{9} \cdot \cancel{(p+4)}} \\ & \qquad \qquad \qquad \frac{p(2p-3)}{6} \end{aligned}$$

HOMEWORK:

Day 1

p 51-52: 1-8 (all), 12-36 (even)